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## FACT SHEET

### **What is a "dirty bomb"?**

A dirty bomb, or radiological dispersion device, is a bomb that combines common explosives, such as dynamite, with radioactive materials, possibly in the form of powder or pellets. When the dirty bomb explodes, radioactive material is blasted into the area around the explosion. Specks of this material might float in the air or fall on surfaces such as streets, cars, roofs, or people. This could cause people and buildings to be exposed to radioactive material, though the amount of radiation would likely be low.

The greatest danger from a dirty bomb is the blast itself. While people in the immediate area of the explosion could be harmed from the explosion, the main purpose of a dirty bomb is to cause widespread fear and make buildings or land unusable for a long period of time.

### **Is a dirty bomb the same as an atomic/nuclear bomb?**

No. Atomic or nuclear explosions, like those that occurred in Hiroshima and Nagasaki during World War II, involve a powerful reaction called fission that is thousands of times stronger than the explosion of a dirty bomb. A dirty bomb does not include the fission reaction necessary to create a large blast; a dirty bomb can only spread radioactive material over a much smaller area. (See "Nuclear and Radiological Incidents" fact sheet for more information.)

### **What are the health effects of a dirty bomb?**

It is unlikely that the amount of radioactive dirt and dust scattered by a dirty bomb would be enough to cause severe illness. Only those people in the immediate vicinity would be exposed, and even then only to low levels of radiation. If a person is exposed, the radioactive particles can either be inhaled or swallowed or get on skin and clothing. The health effects would vary widely, depending on the amount and type of radiation present.

It is important to understand that people are exposed to low levels of radiation every day from the natural "background" radiation found in the environment (such as cosmic rays from space) and from man-made sources (medical tests, x-rays, and cancer treatments, for example). Low levels of radiation do not result in any detectable harm. Moderate levels of radiation can result in health effects such as nausea and vomiting for a day or two. Higher levels could lead to radiation sickness (loss of appetite, skin

reddening, hair loss, diarrhea, and, in extreme cases, death). However, a dirty bomb most likely would not have enough radioactive material in a form that would cause serious radiation sickness among large numbers of people. People who are exposed to radiation scattered by a dirty bomb, however, could have a greater risk of developing cancer later in life, depending on their dose (see "Do dirty bombs cause cancer?" below).

### **Are children at higher risk of harm if exposed to radiation?**

Children exposed to radiation may be at greater risk than adults. Radiation exposure to an unborn child is of special concern because the fetus is extremely sensitive to radiation. The unborn child is at greatest risk during the first quarter of the pregnancy.

### **Where are terrorists most likely to get the radioactive materials needed to make a dirty bomb?**

The most dangerous radioactive materials are found in nuclear power plants and sites where nuclear weapons are made. However, security at these places makes obtaining materials from them difficult.

Because of the danger and difficulty involved in getting radioactive materials from a nuclear facility, there is a greater chance that the radioactive materials used in a dirty bomb would come from other sources with much lower levels of radioactivity. Low-level radioactive materials can be found in such places as hospitals (where they are used for diagnostic procedures and cancer treatments), construction sites (where they are used in industrial radiography), and university research laboratories.

### **What should I do if there is a dirty bomb explosion near me?**

Radiation cannot be seen, smelled, felt, or tasted by humans. If you are at the scene of an explosion, you will not know whether radioactive material is involved. If you are not badly injured by the initial blast, you should:

- Leave the immediate area on foot. Stay calm. Do not take public or private transportation such as buses, subways, or cars, because if radioactive materials were involved, you may contaminate the public transportation system or the car. If you must walk through dust or smoke, you should cover your mouth and nose with a wet handkerchief, cloth, or piece of clothing, as this may help prevent breathing in dust or ash.

- Go inside the nearest building. Staying inside will reduce your exposure to any radioactive material that may be in the dust at the immediate area or in the air. Try to avoid walking around inside the building to prevent the spread of any radioactive dust that you may have been exposed to.
- Once in a safe place, remove your clothes as soon as possible, place them in a plastic bag, and seal the bag. Taking off your clothing will remove most of the dirt and dust and most of the radioactive contamination, if it is present.
- Saving the contaminated clothing would allow testing for radiation at a later time.
- Take a shower or wash yourself as best you can. Washing will reduce the amount of radioactive dirt and dust on the body. Even washing just the parts of your body not covered by clothes (head, neck, and hands) can be helpful. Do not scrub hard or cause the skin to bleed. Use only lukewarm water to wash; do not use hot water.
- Tune into local emergency broadcasts on television or radio for information and further instructions. Once emergency personnel can assess the scene and the damage, officials will be able to tell people whether radiation was actually involved and to what extent. People may be told to leave the area they are staying in or told to stay inside. Staying inside is also known as sheltering in place.

Even if you do not know whether radioactive materials were involved in an explosion, following these simple steps can help reduce injury from other harmful substances, such as chemicals, that might have been present in the blast.

### **What should I do if a dirty bomb explodes in Houston but I am not in the immediate area of the explosion?**

If you are outside when you find out that an explosion has occurred, seek shelter in the nearest building, house, or store where you can tune in to TV or radio broadcasts to get more information.

If you are home or at the office, stay inside. Tune in to local TV or radio broadcasts for information and instructions on how best to protect yourself and your loved ones. Parents with school-aged children should discuss emergency procedures with school administrators ahead of time; however, if your children are at school, they will most likely be kept inside until it is demonstrated that it is safe or necessary to leave the school. Until the type and extent of any contamination is determined and instructions from officials are issued, take the following precautions:

- Remain inside, close all windows, and minimize the opening of doors and windows.
- Turn off fans, air conditioners, and forced air heating units that only bring in fresh air from the outside. Units that can be set on recirculating mode can be operated to avoid excessive heat.
- Do not allow children to play outdoors.
- If you must go outside for lifesaving activities, cover your nose and mouth (preferably with a wet cloth), and avoid stirring up or breathing in dust as much as possible. Minimize the time spent outdoors as much as possible.

### **If City officials confirm that radioactive materials were involved in an explosion, what should I do?**

Keep your TV or radio tuned in to the news. Information on what steps to take to protect yourself and your loved ones will be broadcast.

### **Should potassium iodide (KI) be taken?**

Potassium iodide is a chemical compound that can help protect your thyroid gland from harm if there is a radiological emergency occurring from a nuclear power plant or nuclear device, but in all likelihood it will not provide protection against a dirty bomb. KI does not protect any part of the body other than the thyroid from radiation, nor does it protect against any radioactive substances other than radioactive iodine. Dirty bombs are unlikely to release radioactive iodine. Furthermore, KI must be taken prior to exposure (for example, if people hear that a radioactive cloud is coming their way) or immediately after exposure to be effective. Since there is no way to know at the time of an incident whether radioactive iodine was used in the explosive device, taking KI would probably not be beneficial. Also, KI can be dangerous to some people, such as those allergic to iodine and those with certain thyroid conditions. Taking KI is not recommended unless there is a risk of exposure to radioactive iodine.

### **What would the impact of a dirty bomb be on Houston?**

A dirty bomb could have a serious psychological impact by causing fear and attempting to cause panic. It could also result in radioactive contamination of up to several city blocks, which would require decontamination before they could be lived in or worked in again. The size of the area requiring cleanup would depend on several factors, including the size of the bomb, the amount and type of radioactive materials used, and the weather patterns. Cleanup

efforts may be costly and could take weeks or months to complete. Workers in protective suits would have to remove radioactive dirt from surfaces with various equipment, such as water sprays, vacuums, and sandblasters, as well as remove contaminated plants and soil.

### **Do dirty bombs cause cancer?**

Some cancers can be caused by exposure to radiation. Being at the site where a dirty bomb exploded does not mean that people were exposed to the radioactive material. Until a health care provider or qualified hazardous materials technician is able to screen people and/or their potentially contaminated belongings with sensitive radiation detection devices, it will not be clear whether they were exposed. Being near a radioactive source for a short time, getting a small amount of radioactive material on clothing or skin, or even inhaling a small amount does not necessarily mean that a person will have any adverse health effects. Doctors will be able to assess risks after the exposure levels have been determined.

### **Is there anything specific that Houstonians can do to prepare for a possible nuclear or radiological terrorism event?**

Emergency management officials recommend an "all-hazards" approach to emergency preparedness, which means that one plan can be used for several kinds of emergencies. Creating a household disaster plan, assembling an emergency supply kit, and putting together a bag of supplies you can grab on the go (a "go-bag") will provide you with the tools you need for almost any emergency, including a chemical release. For more information on developing family disaster plans or assembling emergency supply kits, visit **READYAmerica** at <http://www.ready.gov/america/index.html>.

The City of Houston Department of Health and Human Services, along with other government agencies and health institutions, will do everything possible to protect the health of all persons who live, work, or are visiting in Houston. During any public health emergency, health officials will provide instructions through TV and radio on how best to protect yourself and your loved ones. If a chemical release does occur in Houston, stay tuned to the news media. Do NOT immediately rush to hospital emergency rooms. You may not be in immediate danger, and hospitals have to treat those who need immediate care. Furthermore, many treatments will be provided in non-hospital settings (emergency clinics) that would be established in multiple locations throughout the city.

### **What if fears about terrorism are having a serious impact on my family and work life?**

After the events of September 11th, 2001, it is reasonable for individuals to feel anxious about their personal safety. However, if anxiety stops you from doing things that you would normally do, it might be helpful to speak with a professional counselor. Your healthcare provider can make a referral, or you can get help by calling Crisis Hotline at 713-HOTLINE (468-5463 - English) or 713-526-8088 (Spanish), or United Way Help Line at 211.

### **Additional information can be found at:**

- **U.S. Centers for Disease Control and Prevention**  
<http://www.bt.cdc.gov/>
- **Agency for Toxic Substances and Disease Registry**  
<http://www.atsdr.cdc.gov/>